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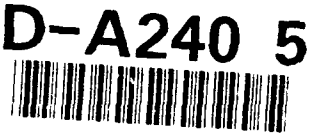

NAVAL WAR COLLEGE
Newport, R.I.

THE COMPOSITE WING: IMPROVED COMBAT OPERATIONS?

by

George C. Mazzeo
COL, USAF

A paper submitted to the Faculty of the Naval War College in partial satisfaction of the requirements of the Department of Operations.

The contents of this paper reflect my own personal views and are not necessarily endorsed by the Naval War College or the Department of the Navy.

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The analysis concludes that the composite wing proposal provides the potential to improve the efficiency of combat air forces by streamlining the planning process, improving command and control, and enhancing coordination during the employment phase. The proposal is feasible and the cost is not prohibitive. The proposal is best suited to forward based forces and fighters. Those combat support aircraft that are either limited in number (AWACS) or on which there is a tremendous demand (Tankers) should remain centrally organized and controlled.

A modified proposal that would address the above issues is developed in the final chapter. Also discussed is an interim training program to bridge the transition period during the restructuring process.

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INTRODUCTION

The national security requirements of the United States are presently under serious review. Changing external threats, along with internal budget restrictions demand a re-examination of those forces required to insure an adequate defense. Like her sister services, the U.S. Air Force is looking at how to deal with future contingencies in the face of declining budgets. We are currently looking at a personnel reduction of approximately 25 percent over the next five years. A corresponding amount of hardware will be transferred to the reserve forces or retired.[1]

A reduction in personnel and equipment means a corresponding reduction in capabilities, unless we can develop more efficient technologies or more efficient means to employ the military assets remaining. Given the magnitude of the force drawdown, it is imperative that we do both. Of the two tasks, the Air Force is considerably more adept at technology development. Over the course of our history, we have successfully managed to integrate new technologies into our weapons systems, keeping potential adversaries at a disadvantage. We also have been successful in developing both evolutionary and revolutionary tactics to employ these new technologies. However, while our hardware and tactics have continued to evolve, our organization has remained stagnant.[2] When expansion or contraction is conducted programmatically on the margins, as it has been in the past, this

type of status quo approach was adequate. With more drastic cuts clearly on the horizon, perhaps now is the time for more innovative solutions.

General Merrill A. McPeak, USAF Chief of Staff is leading the way in the review of how we do business. He has proposed the restructuring of many Air Force organizations from Air Staff to unit level. One of his most interesting proposals would have a significant impact on combat operations, because it affects the very structure of our basic combat unit--the operational flying wing. Currently, the Air Force organizes its tactical wings in a "monolithic" fashion by specific weapon system. For instance, F-15s (air superiority) at one wing, A-10s (close air support) at another, and so on. In the combat theater these divergent wings are brought together on an ad hoc basis, often being called upon to operate from separate airfields. This was predominantly the case during Desert Shield/Desert Storm.

Even given recent successes, there is room for improvement. General McPeak's solution would be to move away from the monolithic wing and to form "composite" wings that combine different weapon systems with differing capabilities to perform as an integrated combat unit. In his proposal, General McPeak discusses why he believes the composite wing structure will increase combat efficiency. At the same time, he takes a realistic view as to maintainability and cost. In this paper, I will examine the strengths and weaknesses of the composite wing proposal and suggest some alternate solutions where appropriate.

The subject of composite wings is extremely broad, cutting across the entire spectrum of combat operations. I will limit the scope of this discussion to planning, command and control, and employment, with the central focus on improved combat efficiency. General McPeak's proposals are radical; they involve fundamental changes in the way we do

business. Such changes produce institutional turmoil and incur, at least in the transition phase, additional costs. The questions to be addressed are: will combat efficiency be improved and is it worth the cost?

CHAPTER II

CURRENT ORGANIZATION

Background

The conventional war fighting capability of the Air Force is predominantly maintained in the Tactical Air Forces (TAF) composed of 24 active and 12 reserve wings. Budget driven force structure reductions will result in these numbers being reduced to 15 active and 11 reserve wings by FY99. The most significant reductions are front loaded and will occur between 1991 and 1993. During that time, the active TAF will be reduced from 88 to 76 squadrons. This loss will encompass 192 A-10s, 60 F-4s, 105 F-15s, 54 F-16s, 78 F-111s, 18 RF-4Cs and 8 EF-111s.[3] Many of these aircraft will be transferred to reserve forces to replace older, less capable systems. The result will be a quantitatively smaller, but qualitatively superior force.

Both active and reserve wings are structured along the time-honored monolithic paradigm--similar aircraft with similar missions in discrete wings. In the past, this organizational structure has proven effective, particularly from a logistics perspective. The requirement to provide large scale, off-aircraft component repair dictated specialized shops with specialized personnel trained in aircraft specific repair skills. Recent advances in component reliability and maintainability have markedly reduced this requirement and have provided innovative thinkers the opportunity to reexamine the basic organizational assumptions under which we have historically operated.[4] These technological advances and their impact will be discussed in detail in a later section.

Operational Shortfalls

General Mcpeak has been articulating his composite wing theory at every available opportunity. The most detailed description of his proposal is contained in the Fall 1990 issue of the Airpower Journal.[5] At the time he authored the article, he was serving as CINC Pacific Air Forces. He begins his argument by identifying the major weakness of the current system--the necessity to integrate diverse forces in-theater to conduct an air campaign. He indicates the major components of the problem are planning, command and control and employment. If we have the luxury of sufficient lead time, as we did with Desert Shield/Desert Storm, these problems can be overcome. However, faced with short-notice contingencies, the current system may prove inadequate.

The planning problem derives from the necessity to build theater forces on short notice to accomplish a desired objective. If the primary mission is close air support (CAS), then the planners must first determine what secondary missions are necessary. They must evaluate the threat to determine the need for counter air and air interdiction. Will air refueling be required? Strategic/tactical airlift? Having defined the required missions, planners must then decide on the necessary forces. Once the forces have been determined, any shortfall existing in the theater must be made up by deploying units to the theater. These units must now be identified, tasked and deployed in a time constrained environment.

The current monolithic structure poses significant command and control problems for the theater commander. The major problem is information flow, both up and down the chain of command. Flowing from the top down is the air tasking order (ATO) which coordinates air assets in-theater. Force status reporting flows in the opposite direction, from the

individual units to the planning staff, supplying them with the data required on forces available in theater. These two functions are mutually dependent in that planners cannot plan without an accurate knowledge of current force status and unit commanders cannot employ their forces without comprehensive data from the planners. They must know targets, time over target (TOT), air refueling areas and control times, AWACS and fighter support, ordnance, fusing, etc.

This data is all published in the ATO which, as demonstrated in Desert Storm, can be an effective instrument. However, the process in cumbersome, requiring 72 hours from inception to the end of the execution day. The planning and execution cycle is drawn out by the need to analyze intelligence data, collate status reports, transmit the ATO, and still allow time for individual units to reconstitute, reload and execute. The inherent flaw in the system is its inflexibility.[6] The long lead time does not provide an adequate mechanism for dealing with rapidly changing battlefield developments. The only solution is to hold a certain portion of your assets in reserve to deal with contingencies--in general, a sound military practice, but an inefficient one if carried to excess.

The requirement to transmit large quantities of information up and down the chain makes the entire process too dependent on our communication system. Excess dependency means excess vulnerability to enemy interdiction. If we can improve command and control, we will simultaneously improve efficiency and reduce vulnerability. The solution does not lie with improved communications or compressed planning, but rather with a change in the way combat forces are organized.

From an employment standpoint, the learning curve is relatively steep during the first days of any campaign. As the various force components gain more experience in integrated operations, their efficiency goes up. This should come as no surprise, since we routinely demonstrate this fact in our combat training exercises such as Red Flag.[7] Again, if we use Desert Storm as a model, all seems well. However, what about those scenarios where the opposition is more capable than the Iraqis, can we afford the luxury of a learning curve? Or, what of a one day operation like the El Dorado Canyon mission in Libya? In that type of scenario, we need to be as efficient as possible the first time out.

Having examined the current organizational structure and its shortcomings, we can now turn our attention to General McPeak's proposed restructuring and evaluate its potential to improve combat operations.

CHAPTER III

THE COMPOSITE WING

Structure

General McPeak's proposal for a composite wing incorporates various aircraft with differing missions that will train, deploy and fight as an integrated unit. A notional composition of such a unit is at Table 1.[8] It is composed of shooters (the general's term) and support aircraft. It is designed as a self-contained, self-sufficient combat unit.

TABLE I

POSSIBLE MAKEUP OF COMPOSITE WING

CAPABILITY	AIRCRAFT
Multi-Role	24 F-16C
Night/Under Weather Attack	12 F-16C LANTIRN
Long Range/Precision Guided Munitions	12 F-15E
Air Superiority	24 F-15C
Air Refueling	6 KC-135R
Surveillance/Control	3 E-3

Source: "McPeak's Plan," Airpower Journal, Fall 1990.

Concept

Shrinking force structure and declining budgets are forcing the Air Force to transition from a forward deployed force to a rapidly deployable one.[9] This shift mandates that those forces that remain forward based be capable of fulfilling a combat role with only organic assets. Time may not be available for additional force elements to deploy to the theater. For

example, if the only air assets in the Korean theater should happen to be a wing of F-16s at Osan, then the types of missions they could fly, and their resultant impact on theater operations, would be severely restricted. There would be no long range interdiction capability, no airborne command and control, and no aerial refueling. In short, this monolithic wing would be limited to air superiority and ground support missions relatively close to its base of operations.

A composite wing, such as the one in Table 1, would have the assets to perform a much wider range of air missions. Its broader mix of shooters provides more mission flexibility. It has its own airborne command and control assets both to direct the battle and identify threats. Its air refueling assets would allow assigned shooters to take off with more ordnance and to operate for a much longer time and at much greater range. In short, the theater commander would have a completely integrated combat unit at his disposal immediately upon initiation of hostilities.

CHAPTER IV

ANALYSIS OF OPERATIONAL ENHANCEMENTS

Planning

General McPeak believes that having composite forces in the theater would significantly reduce the planning burden on the air component commander. Instead of having to select targets and then coordinate dispersed forces, he would need only task the composite wing commander with a specific mission and leave the details to him. If the composite wing commander has sufficient assets, further communication is not required. Should he feel his wing's assets are insufficient, then he would notify the theater CINC of his shortfall and request augmentation from other theater assets, if available.[10]

The strength of this proposal lies in centralized control and decentralized execution. The on-scene commander is in the best position to evaluate his wing's capability to execute an assigned mission.[11] He has the only real-time data on the status of his aircraft, crews and weapons. Furthermore, he has the flexibility to react to real-time changes in the battlefield and to reallocate resources as he sees fit. The present monolithic system does not allow for the same flexibility, because the various mission aircraft are not collocated and possess only their piece of the overall puzzle.

The present monolithic structure has the additional operational disadvantage of concentration of assets. If all CAS assets are at one or two locations, then they become extremely lucrative targets for the enemy.[12] The composite force structure would preclude concentration of any single mission capability at a given location. This force dispersal would

be extremely valuable in a high threat environment and would prevent planners from being deprived of a mission capability theater-wide.

From a planning perspective, the composite wing proposal makes excellent sense when applied to the shooters, but appears to have some significant inefficiencies with regard to the support aircraft--the E-3s and KC-135s. It appears that the AWACS is underutilized and the tankers overtaxed. To provide 24 hour coverage, each wing would require three E-3s, but with only 34 in the entire Air Force inventory, this number would be rapidly exhausted.[13] Furthermore, each AWACS is capable of handling more sorties than its proposed composite wing could generate, thus underutilizing a numerically restricted asset.[14]

On the other hand, the air refueling requirements of the composite wing could easily exceed the capability of the proposed 6 KC-135s, especially if targets are a long way from the operating location. If air refueling capacity is inadequate, then the range and payload of the shooters is curtailed. The exact number of tankers used in Desert Storm is classified, but it can be categorized as a mammoth effort that far exceeded anything the Air Force had attempted to date. Based on the ratio of tankers to receivers in Desert Storm, it would appear that the organic air refueling of the proposed composite wing is inadequate.

One last point concerning these support aircraft from a planning perspective. A large theater air campaign will be either joint, multinational or both. Other services and allies will be dependent on Air Force AWACS and tanker assets. Since we cannot afford to use these assets in an inefficient manner, we must devise a work-around for the problem. One solution would be to only assign these assets to those wings that are permanently forward based around the world. The remainder of these aircraft that deployed to the theater would remain

theater assets and scheduled as they currently are, by the air component commander, to provide the economies of scale necessary to satisfy all requirements.

Command and Control

As previously discussed in the section on operational shortfalls, the major command and control problem is the dissemination of information from the air component commander to the combat units via the ATO. The problem is one of centralized control and execution. Such a system is contrary to Air Force doctrine and, more importantly, lacks flexibility.[15] So much data flows in both directions that the planning cycle is extended to 72 hours. The composite wing would significantly simplify and truncate this process.

As it stands now, each wing commander must wait for his fragmentary or 'frag' order--that portion of the ATO that pertains to his unit. This provides him with every detail of his mission which he in turn executes, leaving him with little room for spontaneous action. The commander of a composite wing would be tasked in a much different manner. He would be assigned a set or category of targets and instructed to use assigned assets as he sees fit to accomplish the mission. Since he possesses a wide spectrum of capabilities, he can set up combat air patrols, determine the number of attackers, plan weapon loading, set up airborne battle management and provide air refueling. In short, he would truly be exercising decentralized execution of a centralized theater plan.

With organic battlefield reconnaissance, he would have enormous flexibility to strike relocatable targets or lucrative targets of opportunity within his area of responsibility. He could also choose the time and tempo of his attacks exploiting weather, darkness or known

enemy weaknesses. Since he is on-scene, he is in a better position to make those decisions than some distant planner on the air component staff.

Since the air component staff would now be freed from much of the detail work, they would be less dependent on data flowing up the chain such as force status reports and battle damage assessments. Additionally, they would have much less data to transmit down the chain. The net result would be a significantly abbreviated ATO and a marked reduction in the 72 hour planning cycle making the entire system more responsive. The air component staff could devote more of its effort towards its primary functions--updating the overall theater plan, deconflicting airspace and prioritizing the distribution of theater assets.

Employment

Basic Air Force doctrine as outlined in AFM 1-1 lists nine basic missions and seven specialized tasks for aerospace forces. Since most conceivable future scenarios will require a mix of these missions and tasks, it is essential to find the most efficient way to employ available assets. In this respect, the composite wing would provide an enormous operational advantage. We would be able to employ forces that live, work and train together as opposed to ones that meet for the first time on a common frequency published in an ATO.

Evidence at Red Flag and other exercises indicates that the longer forces train together, the more efficient they become with integrated operations. This is easy to understand, since familiarity is certain to improve coordination, anticipation and tactics. We would, on a more regular basis, be "training the way we fight." In addition to improved training for our aircrews, we would also be improving the training for our combat leaders, giving them valuable experience in the direction of integrated air forces.

These changes would drive the Air Force closer to its stated doctrinal goal of centralized control and decentralized execution. Instead of merely generating forces to satisfy ATO guidance, the composite wing commander would actually be in a position to plan and execute an assigned mission. The overall allocation of theater resources would remain with the air component commander (centralized control), but the nuts and bolts of employment would pass to the composite wing commander (decentralized execution).

This is much more than a cosmetic change to the way forces are employed. Decisions such as number of aircraft flown, weapons loading, and operational tempo can be made more efficiently at the wing level since the commander has a real-time sense of his mission-ready status and capabilities. He's not dependent, as the air component staff is, on cumbersome force status reports. He's right there and he knows right now what his capabilities are. As a result, he can be much more responsive to changing conditions and reallocate resources as necessary.

So the bottom line is this: The composite wing provides an organizational structure that is more flexible and responsive, while at the same time providing combat efficiencies derived from integrated operations practiced at the wing level. However, there remains one stumbling block to implementation. A composite wing commander cannot effectively employ his force if he cannot sustain it. He can't fly airplanes, if he can't maintain them. Unfortunately, the current maintenance structure does not lend itself to the composite concept.

The Maintenance Problem

A number of senior Air Force leaders including General McPeak himself have indicated that the key to successful composite organization lies with revamping the current maintenance structure. Presently, Air Force maintenance is organized on three levels--organizational, field, and depot. The first two are wing functions. Organizational maintenance is the actual on-aircraft maintenance needed to generate sorties (crew chiefs, etc.). Field maintenance is a series of shops generally dedicated to the off-aircraft repair of various systems and their components. Depot level maintenance is conducted off-station at centralized maintenance centers and involves major aircraft modifications as well as "black box" repair of system components too complex to be handled at the wing level.

The problem for composite operations lies at the field maintenance level. The requirement to multiply the number of technicians and shops by a factor equal to or greater than the number of aircraft assigned to a wing is prohibitive. In an Air Force that is programmed to reduce manpower 25 percent over the next five years, increasing our maintenance manpower requirements is counterproductive and costly. General McPeak identifies the solution as a switch to two-level vice three-level maintenance.[16] He would eliminate field maintenance altogether and go to an organizational/depot system.

Under this concept, organizational maintenance would remove a failed component from the aircraft and replace it with a component drawn from on-hand supplies. The failed component would be shipped to depot for repair. This system would markedly reduce manpower requirements and would make composite organization feasible. There would, however, be a cost. Since no organic component repair capability would exist, supply

inventories would have to be kept at higher levels than they currently are--that's expensive. More importantly, unit war reserve supplies, those with which a unit deploys, would also have to be significantly increased.

In a prolonged conflict, this increased dependence on the depot could prove to be a liability. If component reliability is high, and the trend has been in that direction, there's no problem.[17] However, if reliability falls below expectations, would a system in which the depot and the theater are separated by thousands of miles be responsive enough to keep aircraft mission-ready rates up? For the composite wing to work, we must have either timely resupply or high component reliability.

To improve the way we employ forces, the Air Force must be willing to look at innovative solutions. Changing the maintenance structure is a prerequisite to making the composite wing concept work. The cost would not be prohibitive. In fact, there are tradeoffs. Much of the cost of higher inventories would be offset in reduced maintenance manpower requirements. The composite wing offers the opportunity to improve operational efficiency, not by buying more airplanes, but rather by organizing and employing the ones we have in a "smarter" manner.

CHAPTER V

CURRENT STATUS/ALTERNATE PROPOSALS

Current Status

The composite wing concept is on the fast track, having progressed from the theoretical to the experimental stage of its development. During Desert Storm, forces at Incirlik, Turkey were organized along composite lines and given the responsibility for air operations in northern Iraq. Their mission was to attack targets in the northern third of the country and prevent its use as a sanctuary for Iraqi troops.

Among the assets assigned were F-16C Fighting Falcons, F-4G Wild Weasels, F-15 Eagles, F and EF-111s, KC-135 Stratotankers, E-3 Sentries and EC-130H Compass Call aircraft. Armed with an impressive array of firepower, the Incirlik forces were able to successfully prosecute the air war in the north. The commander of the operation, Brig. Gen. Lee A. Downer cited unity of command as the key to success.[18] General McPeak has said the operation at Incirlik is a good indication of how composite wings will be used in the future.[19]

The Air Force will be forming an experimental composite wing at Mountain Home AFB, Idaho composed of F-15s, F-16s, E-3s and KC-10s.[20] Two wings at Seymour-Johnson AFB, North Carolina are scheduled to merge in the near future, one a wing of TAC F-15s and the other of SAC KC-10s. The wing is being called a multimission wing as opposed to composite.[21] Actually, this appears to be more a marriage of convenience based on consolidation of already collocated assets than a shift to a composite philosophy. A wing of KC-10s is entirely too much air refueling support to dedicate to a single wing of F-15s.

The problem of geographical separation will be a major hurdle in any attempt to switch to a composite structure across the CONUS. It would mean the transfer of thousands of aircraft and tens of thousands of aircrew and maintenance personnel. In today's budget environment, that just doesn't appear feasible. However, with a careful plan spread over a decade, a significant shift to composite organizations might be possible. In the interim, composite organization for forward based wings seems the most practical. It provides the most rapid improvement to theater combat capability and puts us in the best position to deal with contingencies until CONUS based forces can deploy.

Alternate Proposals

As previously stated, I believe the major flaw in the composite wing proposal, as it currently exists, is the possible misallocation of the heavier support aircraft. Since the danger exists that our small inventory of E-3s may be underutilized and our small detachment of KC-135s overtaxed, I would propose the following. Limit the E-3s to three per theater as opposed to three per composite wing. If more than one wing is forward based in a theater, they will need to share this asset under the direction of the air component commander. This would ensure an adequate number of AWACS to meet world-wide and crew training demands as well as more completely utilize the system capability.

I would further propose to increase the tankers assigned to a composite wing from six to ten. This would more approximate a squadron size and provide adequate tasking for a wide range of tactical missions. In addition, having forward deployed tankers would be a major asset in assisting follow-on forces as they deploy. I would propose that tankers be assigned only to composite wings that are forward based. The demand for training SAC,

MAC, TAC and interservice receivers as well as significant commitment to the SIOP mandate centralized scheduling and, to some extent, centralized basing of tanker assets in the CONUS. I also see centralized scheduling of pooled KC-135s and E-3s as the best solution to a large theater operation such as Desert Storm.

Finally, I believe it is possible to accrue some of the operational benefits of composite structure without relocating a significant portion of our CONUS assets. Given that integrated training and familiarity will improve combat effectiveness, doesn't it make sense to identify forces from current monolithic wings to train, exercise and deploy together? By identifying mated forces and integrating them into our current exercises such as Red Flag and Cope Thunder we would certainly increase effectiveness. By naming a permanent commander and identifying a staff for each of these force packages, we would also be providing valuable training to our leaders before they arrived in theater. If nothing else, this seems an excellent interim strategy until the Air Force can reorganize.

CHAPTER VI

CONCLUSION

Composite wings armed with a mixture of aircraft offer the potential to significantly increase combat efficiency. Living, training, exercising and fighting as a cohesive unit will provide an opportunity to integrate combat operations to a degree not possible under the current monolithic structure. By shifting the detail planning work down to the wing level, where it properly belongs, the air component commander can focus his attention on coordinating the theater campaign and prioritizing resources. Command and control will be enhanced by streamlining the ATO planning cycle and by rendering the entire system less vulnerable to interdiction. Finally, employment of combat forces will be enhanced by placing more of the employment decisions in the hands of local commanders who are in the best position to make them. The result will be system of centralized control and decentralized execution more consistent with Air Force doctrine.

To avoid poor utilization of certain combat support air assets such as AWACS and tankers, these aircraft should only be included in composite wings that are forward-based. Subsequent aircraft deployed to the theater should be scheduled by the air component commander to ensure full utilization throughout the theater. Certain other limited assets such as reconnaissance and EW aircraft may also need to be employed in this manner.

The most significant operational enhancement provided by the composite wing is that it provides a complete package of combat capabilities forward based. With a reduction in our overall presence overseas, the remaining forces must be capable of a wide spectrum of

missions in a crisis environment. They will be all we have until reinforcements can deploy from the CONUS.

Can the composite wing work? The answer is yes. As General McPeak says, we need look no further than the Navy's carrier air wing to find an excellent example of a composite wing structure that has proved very effective in numerous combat scenarios. Will there be a cost? Again, the answer is yes. The Air Force will have to switch from three-level to two-level maintenance and will have to absorb the cost of transferring equipment and personnel. However, the benefits outweigh the costs. The composite wing can significantly improve the combat effectiveness of the Air Force. For that reason, it is worth pursuing.

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